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200314101-1

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REMARKS

This is a full and timely response to the final Official Action mailed November 21, 2006. Reconsideration of the application in light of the following remarks is respectfully requested.

Request for Continued Examination:

Applicant hereby requests Continued Examination for this application and entry and consideration of this amendment consequent thereto.

Claim Status:

Claims 31-67 were withdrawn from consideration under a previous Restriction Requirement and cancelled without prejudice or disclaimer. By the present paper, various claims are amended. Claims 10, 14, 16, 69 and 70 have been cancelled without prejudice or disclaimer, and new claims 81 and 82 have been added. Thus, claims 1-9, 11-13, 15, 17-30, 68 and 71-82 are currently pending for further action.

Prior Art:

Claims 1-4, 6, 9-12 and 15-29 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Application Publication No. 2004/0036200 to Patel et al. ("Patel-1").

Claims 1-6, 9-12, 15-29, 68, 69, 73 and 79 were alternatively rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Application Publication No. 2004/0145088 to Patel et al. ("Patel-2").

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Claims 1-6, 9-12, 15-29, 68, 69, 73 and 79 were also rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Application Publication No. 2004/0207123 to Patel et al. ("Patel-3").

For at least the following reasons, these rejections are all respectfully traversed.

Claim 1 recites:

A method for solid free-form fabrication of a three-dimensional object, comprising:  
depositing a bulk amount of phase-change material in a defined region;  
selectively ink-jetting an ultraviolet initiator onto a predetermined area of said defined region, wherein said ultraviolet initiator defines a cross-sectional area of said three-dimensional object;  
*applying ultrasonic energy to said phase-change material, wherein said ultrasonic energy is configured to facilitate a mixing of said phase-change material and said ultraviolet initiator; and*  
exposing said ultraviolet initiator to an ultraviolet light to facilitate cross-linking of said phase-change material according to said predetermined area.  
(Emphasis added).

Support for the amendment to claim 1 can be found in Applicant's originally-filed specification at, for example, claim 14 and paragraph 0046.

In contrast, none of the Patel references teach or suggest "applying ultrasonic energy to said phase-change material, wherein said ultrasonic energy is configured to facilitate a mixing of said phase-change material and said ultraviolet initiator."

"A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. Consequently, for at least this reason, the rejections described above based variously on Patel-1, Patel-2 or Patel-3 (collectively "the Patel references") should be reconsidered and withdrawn as applied to claim 1 and its dependent claims.

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Claim 68 recites:

A method for solid free-form fabrication of a three-dimensional object, comprising:  
depositing a layer of phase-change material;  
selectively applying an ultraviolet initiator in a predetermined pattern to [[a]] said phase-change material, wherein said pattern of said ultraviolet initiator defines a cross-section of said three-dimensional object; and  
exposing said ultraviolet initiator to an ultraviolet light to cross-link said phase-change material in said predetermined pattern,  
*wherein said phase-change material, after being deposited, is in a solid phase, said method further comprising liquefying said phase-change material.*

(Emphasis added).

Support for the amendment to claim 68 can be found in Applicant's originally-filed specification at, for example, paragraphs 0059, 0062 and 0066.

In contrast, none of the Patel references teach or suggest liquefying a phase-change material *after* it has been deposited and with which an ultraviolet initiator is used to selectively define a cross-section of a three-dimensional object.

"A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. Consequently, for at least this reason, the rejections described above, based variously on the Patel references, should be reconsidered and withdrawn as applied to claim 68 and its dependent claims.

Additionally, various dependent claims of the application recite further subject matter that is not taught or suggested by the applied prior art. Specific non-exclusive examples follow.

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Claim 2 recites "The method of claim 1, wherein the depositing a bulk amount of phase-change material step is performed after the selectively ink-jetting an ultraviolet initiator *step for each layer of said three-dimensional object.*" (Emphasis added). Claims 26 and 72 recite similar subject matter. The Patel references clearly do not teach or suggest selectively jetting an ultraviolet initiator and *then* depositing a bulk amount of phase-change build material for *each* layer of a three-dimensional object being fabricated.

Claim 17 recites "wherein said phase-change material comprises one of a stearyl acrylate, a cyclohexane dimethanol dimethacrylate, a cyclohexane dimethanol diacrylate, or a tris (2- hydroxy ethyl) isocyanurate triacrylate." In contrast, the Patel references fail to teach or suggest these materials used as a phase-change build material.

Claim 20 recites "wherein said ultraviolet initiator comprises one of an aromatic ketone or a hydroxyl ketone." Claim 21 recites "wherein said ultraviolet initiator comprises one of a, benzyl dimethyl ketal, a benzoin n-butyl ether, a trimethyl benzophenone, a benzophenone, or an alpha hydroxy ketone." In contrast, the Patel references fail to teach or suggest these materials used as an ultraviolet initiator.

Thus, the Patel references fail to teach or suggest the subject matter of many of the dependent claims of the application. For at least these additional reasons, the rejection of these claims should be reconsidered and withdrawn.

Claims 7, 8, 13, 14, 30, 70-72, 74-78 and 80 were rejected under 35 U.S.C. § 103(a) in view of any one of Patel-1, Patel-2 or Patel-3 taken alone. For at least the following reasons, this rejection is respectfully traversed.

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Claim 7 recites "wherein said ultraviolet light is configured to re-liquefy a surface layer of said phase-change material." The Patel references do not teach or suggest this subject matter.

Claim 8 recites "wherein said ultraviolet light further comprises infrared radiation." The Patel references do not teach or suggest this subject matter.

Claim 13 recites "wherein said non-cross-linked phase-changed material is removed from said cross-linked phase-change material by the application of a thermal energy." The Patel references do not teach or suggest this subject matter.

Claim 30 recites "heating the solid phase change material to a liquid form either before or after the step of ink-jetting the ultraviolet initiator." The Patel references do not teach or suggest this subject matter.

Claim 80 recites "wherein said phase-change material is applied in [[said]] a liquid phase and then solidified, said ultraviolet initiator is then applied to said phase-change material, said phase-change material is then re-liquefied and permeated by said ultraviolet initiator." The Patel references do not teach or suggest this subject matter.

None of this subject matter is anywhere taught or suggested by the cited prior art references. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). Consequently, for at least this additional reason, the rejection of claims 7, 8, 13, 14, 30, 70-72, 74-78 and 80 should be reconsidered and withdrawn.

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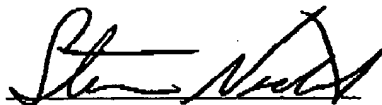
Conclusion:

The newly added claims are thought to be patentable over the prior art of record for at least the same reasons given above with respect to the original claims. Therefore, examination and allowance of the newly added claims is respectfully requested.

For the foregoing reasons, the present application is thought to be clearly in condition for allowance. Accordingly, favorable reconsideration of the application in light of these remarks is courteously solicited. If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

DATE: January 18, 2007

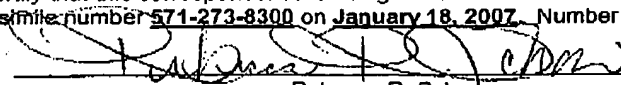
  
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